

WHAT IS CLAIMED IS:

1. A multi DFB laser diode for generating a spontaneous pulse, comprising:

first and second DFB sections each of which has a substrate including
5 a diffraction grating, an active layer formed on the substrate, a clad layer that is formed on the active layer and includes a refraction varying layer, and an electrode formed on the active layer; and

10 a phase tuning section that includes a substrate, an active layer formed on the substrate, a clad layer formed on the active layer, and an electrode, the electrode being isolated from the electrode of the first and second DFB sections.

15 2. The multi DFB laser diode as claimed in claim 1, wherein the refraction varying layer included in the active layer of the first DFB section has a refractive index different from that of the refraction varying layer included in the active layer of the second DFB section.

20 3. The multi DFB laser diode as claimed in claim 1, wherein the first and second DFB sections and the phase tuning section are formed on one substrate, and the electrodes of the first and second DFB sections and the phase tuning section are isolated from each other by an etched groove.

4. The multi DFB laser diode as claimed in claim 1, wherein the outer sides of the first and second DFB sections are shielded by an anti-reflecting thin film.

5. The multi DFB laser diode as claimed in claim 1, wherein the substrate is formed of n-InP, the active layer is formed of InGaAsP, and the clad layer is formed of P-InP.

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6. The multi DFB laser diode as claimed in claim 5, wherein p-InP and n-InP are sequentially deposited on both sides of the active layer in a manner such that the p-InP and n-InP etch both sides of the diffraction grating included in the substrate, to form a p-n-p blocking structure between the clad layer formed on the n-InP layer and the substrate.

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7. The multi DFB laser diode as claimed in claim 1, further comprising a SiNx layer formed between the first and second DFB sections and the clad layer.

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8. A method for fabricating a multi DFB laser diode for generating a spontaneous pulse, the method comprising the steps of:

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forming a substrate;

forming a diffraction grating in the substrate;

forming an active layer on the substrate;

forming refraction varying layers in the active layer;

forming an electrode on the active layer; and

forming two etched grooves to divide the electrode into three parts which are isolated from one another,

wherein the diffraction grating and the refraction varying layer are formed in the regions corresponding to two parts among the divided three electrode parts, which are respectively located at both sides.

- 5 9. The method for fabricating a multi DFB laser diode as claimed in claim 8, wherein the refraction varying layers respectively formed at the regions corresponding to the electrode parts located at both sides have refractive indexes different from each other.